Fact Sheet #13

Groundwater Cleanup Levels

In its 2000 session, the Wyoming Legislature created new opportunities, procedures, and standards for voluntary remediation of contaminated sites. These provisions, enacted as Articles 16, 17, and 18 of the Wyoming Environmental Quality Act and implemented by the Wyoming Department of Environmental Quality (DEQ), will govern future environmental cleanups in Wyoming.

This Fact Sheet contains information about groundwater cleanup levels under the Voluntary Remediation Program (VRP). The cleanup level look-up table provides a simple, easy-to-use method to evaluate whether site groundwater contamination is present at a level that may require further evaluation and/or remediation for protection of human health. This Fact Sheet describes how the groundwater cleanup values in the table were derived and presents general instructions for its use.

1. What is the cleanup level look-up table and where can I find it?

The groundwater portion of the cleanup level look-up table is a list of over 350 individual chemicals from a combination of sources including promulgated levels and risk based cleanup levels, all of which are described in the remainder of this fact sheet. The cleanup level look-up table contains both soil and groundwater cleanup levels and is available in a spreadsheet or PDF format available at: http://deq.state.wy.us/volremedi/factsheets.asp under tabs entitled Combined Cleanup Levels, Soil Cleanup Levels, and Groundwater Cleanup Levels.

2. What are the applicable cleanup levels for contaminants in groundwater in Wyoming?

In Wyoming there are applicable groundwater cleanup levels for both hazardous and non-hazardous substances.

The applicable cleanup levels for groundwater in Wyoming are a combination of promulgated levels and risk based cleanup levels. The promulgated levels include the EPA Safe Drinking Water Act Maximum Contaminant Level (MCL) concentrations and Water Quality Chapter 8 standards. The risk based concentrations are referred to as "Drinking Water Equivalent Levels" (DWELs) for non-carcinogenic chemicals and "Acceptable Drinking Water Levels" (ADWLs) for suspected and known carcinogenic chemicals. The DWELs and ADWLs must be calculated using the equations provided in Part J, Chapter 17, Water Quality Rules and Regulations (available at: http://deq.state.wy.us/wqd/WQDrules/Chapter_17.pdf). A spreadsheet calculator

containing these equations is also available on the VRP website at: http://deq.state.wy.us/volremedi/factsheets.asp .

If available, promulgated levels (MCLs and Water Quality Chapter 8 standard s) are the default groundwater cleanup levels for hazardous and non-hazardous substances under the VRP, and DEQ expects that they will be applied at all VRP sites. When promulgated levels are not available, DWELs/ADWLs should be calculated pursuant to Chapter 17, Part J of Wyoming DEQ Water Quality Rules and Regulations.

Cleanup levels will be established in consideration of the following: 1) the higher of the naturally occurring background concentration compared to the promulgated level; or 2) the higher of the naturally occurring background compared to the DWEL/ADWL level calculated using methods described in Chapter 17, Part J.

For naturally occurring non-hazardous substances, promulgated cleanup levels based on groundwater classification can be found in Table 1 of Chapter 8 Water Quality Rules and Regulations. These Class 1 standards are default cleanup levels, unless the naturally occurring background concentration of the non-hazardous substance in question is higher than the promulgated level. In that instance, the cleanup level is equal to the natural background concentration. The DEQ must approve the method used for determining natural background concentrations. DWELs and ADWLs are also applicable cleanup levels when there is no promulgated cleanup level available.

Alternatively, if land use conditions exist that justify use of another groundwater use class to establish groundwater cleanup standards, this may be considered by DEQ on a site-specific basis.

It is important to note that for both non-hazardous and hazardous substances, the Director of the DEQ has the ability to establish other groundwater cleanup levels in order to protect the aesthetic quality of existing or potential drinking water supplies.

3. What are the cleanup levels for non-hazardous substances if the groundwater is not classified?

Groundwater cleanup levels derived from Chapter 8 of the Wyoming DEQ Water Quality Rules and Regulations are based on groundwater classifications. Where groundwater has not been classified by DEQ, a Volunteer has two choices: determine the natural background concentration for the non-hazardous substances in order to establish the cleanup level, or request that DEQ assign a groundwater classification. When a groundwater classification is requested, DEQ will determine the groundwater class of use in consideration of the current use and the natural background quality of the groundwater.

4. Where can I find the promulgated cleanup levels?

The promulgated cleanup levels for groundwater include the EPA MCLs for hazardous substances and the Water Quality Chapter 8 standards for naturally occurring non-hazardous substances.

The MCLs are published and periodically updated by EPA. Current MCLs are published in the Code of Federal Regulations, Number 40, Part 141 (Primary Drinking Water Regulations) and Part 143 (Secondary Drinking Water Regulations). These documents are also available through the Federal EPA website, at http://water.epa.gov/drink/contaminants/index.cfm .

The promulgated cleanup levels for naturally occurring non-hazardous substances in groundwater are in Table 1 of Chapter 8 of the DEQ Water Quality Rules and Regulations available at http://deq.state.wy.us/wqd/ WQDrules/Chapter_08.pdf .

5. How are MCLs and DWELs/ADWLs for hazardous substances calculated?

The EPA MCLs are established based on a number of factors. Establishing an MCL requires an intensive technological evaluation that includes:

- Consideration of the chemical's occurrence in the environment
- Human exposure in specific and general populations
- Health effects
- Analytical methods of detection
- Chemical transformations of the contaminant in the drinking water
- Calculations of population risks of adverse health effects
- Consideration of the availability of treatment technology and associated costs.

The DWEL values for non-carcinogenic compounds and the ADWL values for carcinogenic compounds, which are the Wyoming DEQ levels for chemicals for which MCLs do not exist, are based solely on consideration of human exposure and health effects.

6. What is the hierarchy I need to follow to determine cleanup levels?

The hierarchy that you need to follow to determine cleanup levels for specific contaminants is as follows:

1. EPA National List of Primary Drinking Water contaminants and their associated MCL's http://water.epa.gov/drink/contaminants/index.cfm#Primary

2. Chapter 8 Water Quality Rules and Regulations for naturally occurring non-hazardous substances, Promulgated cleanup levels are based on Class 1 standards. http://deq.state.wy.us/wqd/WQDrules /Chapter 08.pdf

3. DWELs and ADWLs calculated pursuant to Chapter 17, Part J of Wyoming DEQ Water Quality Rules and Regulations. http://deq.state.wy.us/wqd/WQDrules/Chapter 17.pdf

4. Groundwater cleanup levels for Total Petroleum Hydrocarbons in VRP Fact Sheet #12, Appendix A, Section 3. http://deq.state.wy.us/volremedi/downloads/Current%20Fact%2 0Sheets/FS 12.pdf

5. DEQ-approved natural background concentrations for non-hazardous substances.

6. Ambient Water Quality Standards included in Chapter 1, Wyoming DEQ Water Quality Rules and Regulations. http://deq.state.wy.us/wqd/WQDrules/Chapter 01.pdf

7. EPA National List of Secondary Drinking Water contaminants and their associated standards (these are only used under those unique circumstances when no toxicity data exists for the constituent and a DWEL cannot be calculated or no natural background concentrations are reasonably available). http://water.epa.gov/drink/contaminants/index.cfm#SecondaryList

The cleanup level look-up table that is available in a spreadsheet format at: http://deq.state.wy.us/volremedi/factsheets.asp contains the cleanup levels associated with all levels of this hierarchy in the tab "Groundwater Cleanup Levels." The final selection of the groundwater cleanup level is based on the hierarchy described, above.

7. When using the equations for DWELs and ADWLs included in Chapter 17, Part J of the Wyoming DEQ Water Quality regulations to calculate risk based cleanup levels for hazardous substances, do I always need to assume that groundwater will be used as drinking water?

Wyoming law (§35-11-1605(a)(ii)(B)) establishes that when calculating risk based cleanup levels for hazardous substances in groundwater, you must assume that the groundwater will be used as a drinking water source. This assumption holds true regardless of whether or not the groundwater is currently being used for drinking. Cleanup levels for naturally occurring hazardous substances (such as metals) will be established in consideration of the background concentration; the higher of the naturally occurring background concentration compared to the

DWEL/ADWL levels calculated using methods described in Chapter 17, Part J, or the MCL will be used.

8. How do I determine contaminant levels to compare to applicable groundwater cleanup levels?

Contaminant levels are determined through testing and analysis carried out as part of site characterization. Adequate characterization is necessary before contaminant levels can be compared to applicable groundwater cleanup levels.

For naturally occurring inorganic and non-hazardous contaminants, it will be important to know the range of background concentrations so that cleanup levels can be adjusted accordingly. Volunteers should work with DEQ to determine site characterization activities necessary in order to establish site-specific background concentrations for naturally occurring inorganic and non-hazardous contaminants. Site-specific natural background levels can be determined through sampling efforts at the site in areas that have not been affected, or by compiling groundwater data collected in the vicinity of a site, assuming that the data are of sufficient quality for use in this manner. If Volunteers choose not to collect site-specific data to characterize background, they should consult with DEQ concerning the type of data that may be appropriate and acceptable for this purpose.

9. What if site concentrations exceed applicable cleanup levels?

If you find that contaminant levels exceed applicable groundwater cleanup levels, you should work with DEQ to negotiate a remedy agreement under the VRP. Remedy agreements document the remedial action selected for a site and establish requirements for remedy implementation. Further information on Remedy Agreements is available in Fact Sheet #21, *Remedy Selection*, which is available on the VRP website.

10. What do I do if multiple contaminants are present at my site in groundwater?

Wyoming law (§35-11-1605(a)(ii)(B)) requires that the effect of multiple contaminants be evaluated when site-specific cleanup levels are developed; that is, when promulgated levels are not available. For this reason, a multiple contaminant evaluation is required for soils since soil cleanup levels are not promulgated levels. For more information on soil cleanup levels see Fact Sheet #12, *Soil Cleanup Levels*.

When more than one chemical is present in groundwater and promulgated levels are not available, the calculated site-specific cleanup levels may have to be adjusted to account for potential additive health effects. This adjustment may also have to be performed if a mixture of

promulgated levels and site-specific cleanup levels are applicable to your site, and more than one chemical is present in the groundwater.

DEQ recognizes that the evaluation for multiple contaminants in groundwater may rarely be necessary. However it is important to note that through the process of conducting a site-specific risk assessment, an evaluation will be performed on the potential health effects posed by individual chemicals to determine if the health effects contributions from multiple chemicals are indeed additive.

11. How can I get more information about the VRP?

For specific information to learn about VRP sites in your community, to obtain copies of other VRP fact sheets or other guidance documents, or to volunteer for the program, contact DEQ at (307) 777-7752 or through the VRP website at: http://deq.state.wy.us/volremedi/index.asp .

The VRP website includes all of the fact sheets and other guidance documents for the VRP. This website is updated frequently and includes the latest information about DEQ's progress in developing guidance, policy, and other supporting documents for the VRP.